Navy Advancement Center
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Advancement Handbook for Engineman

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PREFACE

The purpose of the Advancement Handbook is to help you focus your preparation for Navywide advancement-in-rating examinations. The bibliographies (BIBs) together with this handbook form a comprehensive examination study package. Since this handbook provides skill and knowledge components for each paygrade of the Engineman (EN) rating, it helps you concentrate your study on those areas that may be tested. This feature will help you get the most out of your study time.

Each page in Parts 1 through 4 of this Advancement Handbook presents general skill areas, specific skill areas, the knowledge factors associated with each skill area, the pertinent references that address each skill, and the subject areas that may be covered on the examination. The skill statements describe the skills you are expected to perform for each paygrade. The skill statements are cumulative; that is, you are responsible for the skills for the paygrade you are competing for, your present paygrade, and all paygrades below.

Although this handbook is very comprehensive, it cannot cover all the tasks performed in the rating. As a result, the advancement examinations may contain questions more detailed than described in the *"Exam Expectations"* section of the skill areas.

Remember that advancement competition is keen, so your keys to advancement include not only comprehensive advancement examination study but also sustained superior performance.

Prepared by
Navy Advancement Center Department,
Naval Education and Training Professional
Development and Technology Center

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Part 1

Advancement Handbook for EN3

Advancement Handbook for EN3

General EN Skill Area	**Mechanical Systems Operations**
A skill you are expected to perform from the General Skill Area above:	**Align, Start, Operate/Adjust, Stop/Secure Air Compressors/Systems**
Knowledge you should have to perform this skill:	• Identify common types of air compressors by their classification, purpose, function, and associated equipment • Recall the safety procedures for working with rotating machinery and compressed air • Recall procedures for aligning, operating, adjusting, and securing air compressors/systems • Describe the components of air compressors and their associated systems • From a general schematic of an air system, identify the major components of the system • Draw a single line diagram of an air system, showing all-major components
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 505, Piping Systems • NSTM, Chapter 551, Compressed Air Plants and Systems • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1, Chapter 13 • NAVEDTRA 10539, EN3

Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about air compressor (LP, MP, & HP) terminology, operational safety, and inspection of components, troubleshooting, and maintaining air systems.

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General EN Skill Area	Mechanical Systems Operations
A skill you are expected to perform from the General Skill Area above:	**Align, Start, Operate/Adjust, Stop/Secure Drain, Ballasting, and Deballasting Systems**
Knowledge you should have to perform this skill:	• Identify the types of drain and ballasting compressors by their classification, purpose, function, and associated equipment • Recall the safety procedures for working with rotating machinery • Recall how to align, operate, adjust, and secure drain and deballasting systems • Describe the components of drain and deballasting and their associated systems • From a general schematic of a drain and deballasting system, identify the major components of the system • Draw a single line diagram of a drain and deballasting system, showing all-major components
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 505, Piping Systems • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1, Chapter 13 • NAVEDTRA 10539, EN3
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about drain and ballasting systems, terminology, operational safety, inspection, maintenance and troubleshooting, and associated system machinery.

General EN Skill Area	**Mechanical Systems Operations**
A skill you are expected to perform from the General Skill Area above:	**Align, Start, Operate/Adjust, Stop/Secure Auxiliary Boilers and (LP) Steam Drain Systems**
Knowledge you should have to perform this skill:	• Identify the types of auxiliary boilers, steam drain system, their purpose, function, and associated equipment • Recall the safety procedures for working around auxiliary boilers and working with steam drain systems • Recall how to align, light-off, operate, adjust, and secure auxiliary boilers and (LP) steam drain systems • Recall procedures for testing and treating auxiliary boilers and feedwater • Describe the components of auxiliary boilers and steam drain systems • From a general schematic of an auxiliary boiler and steam drain system, identify the major components of the system • Draw a single line diagram of an auxiliary boiler and steam drain system, showing all-major components
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 220, Volume 1, Boiler Water/Feedwater-Water Chemistry • NSTM, Chapter 220, Volume 2, Boiler Water/Feedwater-Test and Treatment • NSTM, Chapter 221, Boilers • NSTM, Chapter 505, Piping Systems • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1,

	Chapter 13 • NAVEDTRA 10539, EN3
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about auxiliary boilers, steam drain, and collection systems, terminology, operational safety, inspection, maintenance and troubleshooting of components, and associated system machinery.

General EN Skill Area	**Mechanical Systems Operations**
A skill you are expected to perform from the General Skill Area above:	**Align, Operate/Adjust, and Secure Distilling Plants and Potable Water Systems**
Knowledge you should have to perform this skill:	• Identify the types of distilling plants (low pressure, submerged tube, flash, reverse osmosis) and distillate transfer systems used to make water • Recall the safety procedures for working with machinery • Recall procedures for aligning, operating, adjusting, and securing distilling plants and systems • Recall procedures for testing and treating water • Describe the components of distilling plants and transfer systems • From a general schematic of a distilling plant and potable water system, identify the major components of the system • Draw a single line diagram distilling plant and potable water system, showing all-major components
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 254, Condensers, Heat Exchangers, and Air Ejectors • NSTM, Chapter 505, Piping Systems • NSTM, Chapter 531, Volume 1, Desalination Low-Pressure Distilling Plants • NSTM, Chapter 531, Volume 2, Desalination Vapor Compression Distilling Plants

	• NSTM, Chapter 531, Volume 3, Desalination Reverse Osmosis Distilling Plants • NSTM, Chapter 533, Potable Water Systems • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1, Chapter 13 • NAVEDTRA 10539, EN3
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about distilling plants and transfer systems, safety, terminology, operation, inspection, maintenance, testing, and troubleshooting of system components.

General EN Skill Area	**Mechanical Systems Operations**
A skill you are expected to perform from the General Skill Area above:	**Align, Operate/Adjust, and Secure Fuel, Lube, Hydraulic, Purification, Transfer, and Oily Waste Systems**
Knowledge you should have to perform this skill:	• Identify the types of fuel, lube, and hydraulic systems, along with transfer system components and pumps (gear, centrifugal, vane, etc.), their classification, use, purpose, function, and related equipment • Recall the safety procedures for working around rotating machinery • Recall how to align, start, operate, adjust, and secure fuel, lube, and hydraulic systems • Describe the various components of installed systems • From a general schematic of fuel, lube, hydraulic, purification, transfer, and oily waste system, identify the major components of the system • Draw a single line diagram of a fuel, lube, hydraulic, purification, transfer, and oily waste system, showing all-major components
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 233, Diesel Engines • NSTM, Chapter 241, Propulsion Reduction Gears, Couplings, Clutches, and Associated Components • NSTM, Chapter 243, Propulsion Shafting • NSTM, Chapter 244, Propulsion Bearings and Seals • NSTM, Chapter 262, Lubricating Oils,

	Greases, Specialty Lubricants, and Lubrication Systems • NSTM, Chapter 503, Pumps • NSTM, Chapter 505, Piping Systems • NSTM, Chapter 541, Ship Fuel and Fuel Systems • NSTM, Chapter 542, Gasoline and JP-5 Fuel Systems • NSTM, Chapter 562, Surface Ship Steering Systems • NSTM, Chapter 670, Stowage, Handling, and Disposal of Hazardous General Use Consumables • OPNAVINST 4100.11, Navy Energy Reporting System (NEURS) • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1, Chapter 13 • NAVEDTRA 10539, EN3
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about types of pumps and their use, classification, purpose, function, and related equipment used for F/O & L/O service, transfer systems, and hydraulic systems, safety, terminology, component operation, inspection, maintenance, testing, and troubleshooting of systems.

General EN Skill Area	**Mechanical Systems Operations**
A skill you are expected to perform from the General Skill Area above:	**Align, Operate/Adjust, and Secure Cooling Water Systems**
Knowledge you should have to perform this skill:	• Identify different types of cooling water systems used, their classification, purpose, function, and related equipment • Recall the safety procedures for working around rotating machinery • Recall how to align, start, operate, adjust, and secure cooling water systems • Describe various components of cooling water systems • From a general schematic of a cooling water system, identify the major components of the system • Draw a single line diagram of a cooling water system, showing all-major components
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 220, Volume 3, Corrosion and Contamination Control for Diesel Engine Cooling Water Systems • NSTM, Chapter 233, Diesel Engines • NSTM, Chapter 254, Condensers, Heat Exchangers, and Air Ejectors • NSTM, Chapter 505, Piping Systems • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1, Chapter 13 • NAVEDTRA 10539, EN3

Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about types of cooling systems classification, use, purpose, function and related equipment used, component operation, inspection, maintenance, testing, and troubleshooting of systems.

General EN Skill Area	**Mechanical Systems Operations**
A skill you are expected to perform from the General Skill Area above:	**Align, Operate/Adjust, and Secure Fire and Flushing Systems (Main and Secondary Drainage)**
Knowledge you should have to perform this skill:	• Identify fire and flushing water systems, main and secondary drainage system used, their classification, purpose, function, and related equipment • Recall the safety procedures for working around rotating machinery • Recall how to align, start, operate, adjust, and secure fire, flushing, main and secondary drainage systems • Describe various components of installed fire and flushing systems, including main and secondary drainage systems • From a general schematic of a fire and flushing systems, including main and secondary drainage systems, identify the major components • Draw a single line diagram of a fire and flushing system, including main and secondary drainage systems, showing all-major components
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 079, Volume 2, Damage Control-Practical Damage • NSTM, Chapter 503, Pumps • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual For Forces Afloat, Volume1, Chapter 13 • NAVEDTRA 10539, EN3

Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about various types of fire and flushing systems, their classification, use, purpose, function and related equipment used, component operation, inspection, maintenance, testing, and troubleshooting of systems.

General EN Skill Area	**Mechanical Systems Operations**
A skill you are expected to perform from the General Skill Area above:	**Align, Operate/Adjust, and Secure Air Conditioning and Refrigeration (A/C & R) Systems**
Knowledge you should have to perform this skill:	• Identify the various types of A/C & R used, their classification, purpose, function, and related equipment components • Recall the safety procedures for working around rotating machinery • Recall how to align, start, operate, adjust, secure A/C & R plants and refrigeration recovery units • From a general schematic of an A/C & R system, identify the major components of the system • Draw a single line diagram of an A/C & R system, showing all-major components
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 504, Pressure, Temperature, and Other Mechanical and Electromechanical Measuring Instruments • NSTM, Chapter 510, Heating, Ventilating, and Air Conditioning Systems for Surface Ships • NSTM, Chapter 516, Refrigeration Systems • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1, Chapter 13 • NAVEDTRA 10539, EN3

Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about various types of A/C & R plants and refrigeration recovery units, their classification, use, purpose, function and related equipment used, component operation, inspection, maintenance, testing, and troubleshooting of systems.

General EN Skill Area	**Mechanical Systems Operations**
A skill you are expected to perform from the General Skill Area above:	**Align, Start, Operate/Adjust, and Secure Diesel Engines and Main Reduction Gear (MRG) Systems to include Engaging/ Disengaging Clutches and Jacking Gears**
Knowledge you should have to perform this skill:	• Identify the various types of diesel engines and MRGs in service by the Navy, their classification, purpose, function, and related equipment components • Recall the safety procedures for working around rotating machinery • Recall how to align, start, operate, adjust, stop, secure diesel engines and MRG's systems • Describe the various components of installed systems • From a general schematic of a diesel engine and MRG system, identify the major components of the system • Draw a single line diagram of a diesel engine and MRG's systems, showing all-major components
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 079, Volume 3, Damage Control-Engineering Casualty Control • NSTM, Chapter 220, Volume 3, Corrosion and Contamination Control for Diesel Engine Cooling Water Systems • NSTM, Chapter 233, Diesel Engines • NSTM, Chapter 241, Propulsion Reduction Gears, Couplings, Clutches, and Associated Components • NSTM, Chapter 243, Propulsion Shafting

	• NSTM, Chapter 244, Propulsion Bearings and Seals • NSTM, Chapter 245, Propellers • NSTM, Chapter 262, Lubricating Oils, Greases, Specialty Lubricants, and Lubrication Systems • NSTM, Chapter 503, Pumps • 0910-LP-118-1600, Diesel Inspector Handbook, Part 1 • 0910-LP-118-1700, Diesel Inspector Handbook, Part 2 • NAVEDTRA 12170, Engineman Fundamentals, Volume1 • NAVEDTRA 10539, EN3
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about various types of diesel engines and MRG units, their classification, use, purpose, function and related equipment used, component operation, inspection, maintenance, testing, and troubleshooting of systems.

General EN Skill Area	**Mechanical Systems Operation**
A skill you are expected to perform from the General Skill Area above:	**Record Pressure and Temperature Readings**
Knowledge you should have to perform this skill:	• Identify and record various types of pressure and temperature gauges used to take readings, their classification, purpose, and function • Recall the safety procedures for working around rotating machinery
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 504, Pressure, Temperature, and Other Mechanical and Electromechanical Measuring Instruments • NAVEDTRA 10539, EN3 • NAVEDTRA 12170, Engineman Fundamentals, Volume 1
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about recording pressure and temperature readings on a variety of equipment, their classification, use, purpose, function, inspection, maintenance, and testing.

General EN Skill Area	**Mechanical Maintenance**
A skill you are expected to perform from the General Skill Area above:	**Maintain Fuel and Lube Oil Systems**
Knowledge you should have to perform this skill:	• Recall maintenance, repair requirements, and procedures for Navy fuel and lube oil systems, their function, and related equipment components • Recall the safety procedures for working with flammable liquids and hazardous materials • Identify the procedures to tagout and isolate system(s) • Remove, disassemble, clean, inspect, repair, and test system components in accordance with PMS or NAVSEA technical manuals
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 078, Volume1, Seals • NSTM, Chapter 233, Diesel Engines • NSTM, Chapter 241, Propulsion Reduction Gears, Couplings, Clutches, and Associated Components • NSTM, Chapter 244, Propulsion Bearings and Seals • NSTM, Chapter 262, Lubricating Oils, Greases, Specialty Lubricants, and Lubrication Systems • NSTM, Chapter 503, Pumps • NSTM, Chapter 505, Piping Systems

Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about maintaining fuel and lube oil system equipment, arrangement of components, operation, purpose, inspection, upkeep, and testing.

General EN Skill Area	**Mechanical Maintenance**
A skill you are expected to perform from the General Skill Area above:	**Maintain Air Systems**
Knowledge you should have to perform this skill:	• Recall maintenance, repair requirements, and procedures for LP, MP, and HP air systems, their function, and related equipment components • Recall the safety procedures for working with flammable liquids and hazardous materials • Identify the procedures to tagout and isolate system(s) • Remove, disassemble, clean, inspect, repair, and test system components in accordance with PMS or NAVSEA technical manuals
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 505, Piping Systems • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1, Chapter 13 • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 4, Test, Inspections and Special Applications Maintenance Programs • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 5, Quality Maintenance (QA Manual) • NAVEDTRA 10539, EN3

Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about maintaining LP, MP, and HP air system(s) equipment, arrangement of components, operation, purpose, inspection, maintenance, troubleshooting, repair, and testing.

General EN Skill Area	**Mechanical Maintenance**
A skill you are expected to perform from the General Skill Area above:	**Maintain Steam Systems**
Knowledge you should have to perform this skill:	• Recall maintenance, repair requirements, and procedures for steam systems, their function, and related equipment components • Recall the safety procedures for working with steam • Identify the procedures to tagout and isolate system(s) • Remove, disassemble, clean, inspect, repair, and test system components in accordance with PMS or NAVSEA technical manuals
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 075, Fasteners • NSTM, Chapter 505, Piping Systems • NSTM, Chapter 220, Volume 1, Boiler Water/Feedwater-Water Chemistry • NSTM, Chapter 220, Volume 2, Boiler Water/Feedwater-Test and Treatment • NSTM, Chapter 221, Boilers • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1, Chapter 13 • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 4, Test, Inspections and Special Applications Maintenance Programs • Joint Fleet Maintenance Manual (JFMM),

	CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 5, Quality Maintenance (QA Manual) • NAVEDTRA 10539, EN3
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about maintaining steam system(s) equipment, arrangement of components, operation, purpose, inspection, maintenance, troubleshooting, repair, and testing.

General EN Skill Area	**Mechanical Maintenance**
A skill you are expected to perform from the General Skill Area above:	**Maintain Cooling Systems**
Knowledge you should have to perform this skill:	• Recall maintenance, repair requirements, and procedures for cooling systems, their function, and related equipment components • Recall the safety procedures for working with equipment • Identify the procedures to tagout and isolate system(s) • Remove, disassemble, clean, inspect, repair, and test system components in accordance with PMS or NAVSEA technical manuals
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 075, Fasteners • NSTM, Chapter 505, Piping Systems • NSTM, Chapter 220, Volume 3, Corrosion and Contamination Control for Diesel Engine Cooling Water Systems • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1, Chapter 13 • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 4, Test, Inspections and Special Applications Maintenance Programs • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 5, Quality Maintenance

	(QA Manual) • NAVEDTRA 10539, EN3
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about maintaining cooling system(s) equipment, arrangement of components, operation, inspection, maintenance, troubleshooting, repair, and testing.

General EN Skill Area	**Mechanical Maintenance**
A skill you are expected to perform from the General Skill Area above:	**Maintain Hydraulic Systems**
Knowledge you should have to perform this skill:	• Recall maintenance, repair requirements, and procedures for hydraulic systems, their function, and related equipment components • Recall the safety procedures for working with rotating equipment and hydraulic system pressures • Identify the procedures to tagout and isolate system(s) • Remove, disassemble, clean, inspect, repair, and test system components in accordance with PMS or NAVSEA technical manuals
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 075, Fasteners • NSTM, Chapter 243, Propulsion Shafting • NSTM, Chapter 244, Propulsion Bearings and Seals • NSTM, Chapter 245, Propellers • NSTM, Chapter 262, Lubricating Oils, Greases, Specialty Lubricants, and Lubrication Systems • NSTM, Chapter 503, Pumps • NSTM, Chapter 505, Piping Systems • NSTM, Chapter 556, Hydraulic Equipment (Power Transmission and Control) • NSTM, Chapter 562, Surface Ship Steering Systems • NSTM, Chapter 670, Stowage, Handling, and Disposal of Hazardous General Use

	Consumables • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1, Chapter 13 • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 4, Test, Inspections and Special Applications Maintenance Programs • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 5, Quality Maintenance (QA Manual) • NAVEDTRA 12964, Fluid Power • NAVEDTRA 10539, EN3
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about maintaining hydraulic system(s) equipment, arrangement of components, operation, purpose, inspection, maintenance, troubleshooting, repair, and testing.

General EN Skill Area	**Mechanical Maintenance**
A skill you are expected to perform from the General Skill Area above:	**Maintain Winches, Windlasses, Davits, and Bow Ramps**
Knowledge you should have to perform this skill:	• Recall maintenance, repair requirements, and procedures for winches, anchor windlasses, boat davits and bow ramp systems, their function, and related equipment components • Recall the safety procedures for working with rotating equipment • Identify the different procedures to tagout and isolate system(s) • Remove, disassemble, clean, inspect, repair, and test system components in accordance with PMS or NAVSEA technical manuals
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 075, Fasteners • NSTM, Chapter 262, Lubricating Oils, Greases, Specialty Lubricants, and Lubrication Systems • NSTM, Chapter 503, Pumps • NSTM, Chapter 505, Piping Systems • NSTM, Chapter 556, Hydraulic Equipment (Power Transmission and Control) • NSTM, Chapter 573, Booms • NSTM, Chapter 581, Anchoring • NSTM, Chapter 584, Stern Gates, Ramps, Bow Doors, Turntables and Water Barriers • NSTM, Chapter 670, Stowage, Handling, and Disposal of Hazardous General Use Consumables • OPNAVINST 5100.19, Navy Occupational

	Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1, Chapter 13 • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 4, Test, Inspections and Special Applications Maintenance Programs • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 5, Quality Maintenance (QA Manual) • NAVEDTRA 12964, Fluid Power • NAVEDTRA 10539, EN3
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about maintaining winches, anchor windlasses, davits, and bow ramp system(s) equipment, arrangement of components, operation, purpose, inspection, maintenance, troubleshooting, repair, and testing.

General EN Skill Area	**Mechanical Maintenance**
A skill you are expected to perform from the General Skill Area above:	**Maintain Monorails, Conveyors, Cranes, Escalators, and Elevators**
Knowledge you should have to perform this skill:	• Recall maintenance, repair requirements, and procedures for monorails, conveyors, cranes, escalators, and systems, their function, and related equipment components • Recall the safety procedures for working with rotating equipment and working aloft • Identify the procedures to tagout and isolate system(s) • Remove, disassemble, clean, inspect, repair, and test system components in accordance with PMS or NAVSEA technical manuals
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 075, Fasteners • NSTM, Chapter 262, Lubricating Oils, Greases, Specialty Lubricants, and Lubrication Systems • NSTM, Chapter 505, Piping Systems • NSTM, Chapter 556, Hydraulic Equipment (Power Transmission and Control) • NSTM, Chapter 572, Shipboard Stores and Provisions Handling • NSTM, Chapter 573, Booms • NSTM, Chapter 589, Cranes • NSTM, Chapter 670, Stowage, Handling, and Disposal of Hazardous General Use Consumables • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program

	Manual for Forces Afloat, Volume 1, Chapter 13 • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 4, Test, Inspections and Special Applications Maintenance Programs • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 5, Quality Maintenance (QA Manual) • NAVEDTRA 10539, EN3
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about maintaining monorails, conveyors, cranes, escalators, and elevator system(s) equipment, arrangement of components, operation, purpose, inspection, maintenance, troubleshooting, repair, and testing.

General EN Skill Area	**Mechanical Maintenance**
A skill you are expected to perform from the General Skill Area above:	**Maintain Laundry, Galley, Scullery, Mess Deck Equipment, and Hot Water Heaters**
Knowledge you should have to perform this skill:	• Recall maintenance, repair requirements, and procedures for laundry, galley, scullery, mess deck equipment, and hot water heater system(s), their function, and related equipment components • Recall the safety procedures for working with rotating equipment • Identify the procedures to tagout and isolate system(s) • Remove, disassemble, clean, inspect, repair, and test system components in accordance with PMS or NAVSEA technical manuals
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 655, Laundry • NSTM, Chapter 9340, Commissary Equipment • NSTM, Chapter 572, Shipboard Stores and Provisions Handling • NAVEDTRA10539, EN3
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about maintaining laundry, galley, scullery, mess deck equipment, and hot water heater system(s) equipment, arrangement of components, operation, purpose, inspection, maintenance, troubleshooting, repair, and testing.

General EN Skill Area	**Mechanical Maintenance**
A skill you are expected to perform from the General Skill Area above:	**Maintain Gasoline and Diesel Engines**
Knowledge you should have to perform this skill:	• Recall maintenance, repair requirements, and procedures for gasoline and diesel engine system(s), their function, and related equipment components • Recall the safety procedures for working with rotating equipment • Identify the procedures to tagout and isolate system(s) • Remove, disassemble, clean, inspect, repair, and test system components in accordance with PMS or NAVSEA technical manuals
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 220, Volume 3, Corrosion and Contamination Control for Diesel Engine Cooling Water Systems • NSTM, Chapter 233, Diesel Engines • NSTM, Chapter 503, Pumps • NSTM, Chapter 505, Piping Systems • NSTM, Chapter 541, Ship Fuel and Fuel Systems • NSTM, Chapter 542, Gasoline and JP-5 Fuel Systems • NSTM, Chapter 583, Boats and Small Craft • 0910-LP-118-1600, Diesel Inspector Handbook, Part 1 • 0910-LP-118-1700, Diesel Inspector Handbook, Part 2 • OPNAVINST 5100.19, Navy Occupational

	Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1, Chapter 13 • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 4, Test, Inspections and Special Applications Maintenance Programs • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 5, Quality Maintenance (QA Manual) • NAVEDTRA 10539, EN3 • NAVEDTRA 12170, Engineman Fundamentals, Volume 1
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about maintaining gasoline and diesel engine system(s) equipment, arrangement of components, operation, purpose, inspection, maintenance, troubleshooting, repair, and testing.

General EN Skill Area	**Mechanical Maintenance**
A skill you are expected to perform from the General Skill Area above:	**Maintain Couplings, Shafts, Stern Tubes, Clutches, and Transmissions**
Knowledge you should have to perform this skill:	• Recall maintenance, repair requirements, and procedures for couplings, shafts, stern tubes, clutches, and transmission system(s), their function, and related equipment components • Recall the safety procedures for working with rotating equipment • Identify the procedures to tagout and isolate system(s) • Remove, disassemble, clean, inspect, repair, and test system components in accordance with PMS or NAVSEA technical manuals
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 078, Volume1, Seals • NSTM, Chapter 241, Propulsion Reduction Gears, Couplings, Clutches, and Associated Components • NSTM, Chapter 243, Propulsion Shafting • NSTM, Chapter 244, Propulsion Bearings and Seals • NSTM, Chapter 245, Propellers • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1, Chapter 13 • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3,Volume 4, Test, Inspections and Special Applications Maintenance

	Programs • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 5, Quality Maintenance (QA Manual) • NAVEDTRA 10539, EN3
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about maintaining couplings, shafts, stern tubes, clutches, and transmission system(s) equipment, arrangement of components, operation, purpose, inspection, maintenance, troubleshooting, repair, and testing.

General EN Skill Area	**Mechanical Maintenance**
A skill you are expected to perform from the General Skill Area above:	**Maintain Propeller Pitch Control Units**
Knowledge you should have to perform this skill:	• Recall maintenance, repair requirements, and procedures for propeller pitch control system(s), their function, and related equipment components • Recall the safety procedures for working with rotating equipment • Identify the procedures to tagout and isolate system(s) • Remove, disassemble, clean, inspect, repair, and test system components in accordance with PMS or NAVSEA technical manuals
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 078, Volume 1, Seals • NSTM, Chapter 245, Propellers • NSTM, Chapter 505, Piping Systems • NSTM, Chapter 556, Hydraulic Equipment (Power Transmission and Control) • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1, Chapter 13 • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 4, Test, Inspections and Special Applications Maintenance Programs • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 5, Quality Maintenance

	(QA Manual) • NAVEDTRA 10539, EN3
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about maintaining propeller pitch control units system components, operation, purpose, inspection, maintenance, troubleshooting, repair, and testing.

General EN Skill Area	**Mechanical Maintenance**
A skill you are expected to perform from the General Skill Area above:	**Maintain Reduction Gears**
Knowledge you should have to perform this skill:	• Recall maintenance, repair requirements, and procedures for reduction gear systems and related equipment components • Recall the safety procedures for working with rotating equipment • Identify the procedures to tagout and isolate system(s) • Remove, disassemble, clean, inspect, repair, and test system components in accordance with PMS or NAVSEA technical manuals
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 241, Propulsion Reduction Gears, Couplings, Clutches, and Associated Components • NSTM, Chapter 243, Propulsion Shafting • NSTM, Chapter 244, Propulsion Bearings and Seals • NSTM, Chapter 245, Propellers • NSTM, Chapter 556, Hydraulic Equipment (Power Transmission and Control) • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1, Chapter 13 • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 4, Test, Inspections and Special Applications Maintenance Programs

	• Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 5, Quality Maintenance (QA Manual) • NAVEDTRA 10539, EN3
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about maintaining reduction gear systems equipment, arrangement of components, operation, purpose, inspection, maintenance, troubleshooting, repair, and testing.

General EN Skill Area	**Mechanical Maintenance**
A skill you are expected to perform from the General Skill Area above:	**Maintain Firemain Systems**
Knowledge you should have to perform this skill:	• Recall maintenance, repair requirements, and procedures for firemain system(s), including: main and secondary drainage, their function, and related equipment components • Recall the safety procedures for working with rotating equipment • Identify the procedures to tagout and isolate system(s) • Remove, disassemble, clean, inspect, repair, and test system components in accordance with PMS or NAVSEA technical manuals
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 505, Piping Systems • NSTM, Chapter 555, Volume 1, Surface Ship Firefighting • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1, Chapter 13 • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790. 3, Volume 4, Test, Inspections and Special Applications Maintenance Programs • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 5, Quality Maintenance (QA Manual)

	• NAVEDTRA 10539, EN3
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about maintaining firemain systems, main and secondary drainage system(s) equipment, arrangement of components, operation, purpose, inspection, maintenance, troubleshooting, repair, and testing.

General EN Skill Area	**Mechanical Maintenance**
A skill you are expected to perform from the General Skill Area above:	**Maintain Stripping, Drain, Bilge, and Tank Systems**
Knowledge you should have to perform this skill:	• Recall maintenance, repair requirements, and procedures for stripping, drain, bilge, and tank system(s), their function, and related equipment components • Recall the safety procedures for working with rotating equipment • Identify the procedures to tagout and isolate system(s) • Remove, disassemble, clean, inspect, repair, and test system components in accordance with PMS or NAVSEA technical manuals
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 505, Piping Systems • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1, Chapter 13 • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 4, Test, Inspections and Special Applications Maintenance Programs • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 5, Quality Maintenance (QA Manual) • NAVEDTRA 10539, EN3

Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about maintaining stripping, drain, bilge, and tank system(s) equipment, arrangement of components, operation, purpose, inspection, maintenance, troubleshooting, repair, and testing.

General EN Skill Area	**Mechanical Maintenance**
A skill you are expected to perform from the General Skill Area above:	**Maintain Pumps**
Knowledge you should have to perform this skill:	• Recall maintenance, repair requirements, and procedures for pumps, theory, function, and related equipment components • Recall the safety procedures for working with rotating equipment • Identify the procedures to tagout and isolate system(s) • Remove, disassemble, clean, inspect, repair, and test pump components in accordance with PMS or NAVSEA technical manuals
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 078, Volume1, Seals • NSTM, Chapter 503, Pumps • NSTM, Chapter 505, Piping Systems • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1, Chapter 13 • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 4, Test, Inspections and Special Applications Maintenance Programs • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 5, Quality Maintenance (QA Manual) • NAVEDTRA 10539, EN3 • NAVEDTRA 12964, Fluid Power

Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about maintaining pumps, arrangement of components, operation, purpose, inspection, maintenance, troubleshooting, repair, and testing.

General EN Skill Area	**Mechanical Maintenance**
A skill you are expected to perform from the General Skill Area above:	**Maintain Air Conditioning & Refrigeration, and Ventilation Systems**
Knowledge you should have to perform this skill:	• Recall maintenance, repair requirements, and procedures for A/C&R and ventilation equipment system(s), theory, function, and related equipment components • Recall the safety procedures for working with rotating equipment and handling refrigerants • Recall the procedures used to tagout and isolate system(s) • Recall procedures required to remove, disassemble, clean, inspect, repair, and test A/C&R system components in accordance with PMS or NAVSEA technical manuals
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 510, Heating, Ventilating, and Air Conditioning Systems for Surface Ships • NSTM, Chapter 516, Refrigeration Systems • NSTM, Chapter 593, Pollution Control • NSTM, Chapter 670, Stowage, Handling, and Disposal of Hazardous General Use Consumables • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1, Chapter 13 • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 4, Test, Inspections and Special Applications Maintenance

	Programs • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 5, Quality Maintenance (QA Manual) • NAVEDTRA 10539, EN3
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about maintaining A/C&R equipment, theory, arrangement of components, operation, purpose, inspection, maintenance, troubleshooting, repair, and testing.

General EN Skill Area	**Mechanical Maintenance**
A skill you are expected to perform from the General Skill Area above:	**Maintain Precision Tools**
Knowledge you should have to perform this skill:	• Recall maintenance and repair requirements and procedures for precision mechanical measuring tools in accordance with PMS or NAVSEA technical manuals
References you should study to gain the knowledge you need to perform this skill:	• NAVEDTRA 12085, Use and Care of Hand Tools and Measuring Tools • NSTM, Chapter 504, Pressure, Temperature, and Other Mechanical and Electromechanical Measuring Instruments • 0910-LP-118-1600, Diesel Inspector Handbook, Part 1 • NAVEDTRA 10539, EN3
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about maintaining, cleaning, stowage, repair of general hand tools and measuring equipment

General EN Skill Area	**Mechanical Maintenance**
A skill you are expected to perform from the General Skill Area above:	**Maintain Reducing Stations**
Knowledge you should have to perform this skill:	• Recall maintenance and repair requirements and procedures for reducing stations, function, and related equipment components • Recall safety precautions for working with rotating equipment • Recall the procedures required to tagout and isolate system(s) • Remove, disassemble, clean, inspect test reducing stations, system components in accordance with PMS or NAVSEA technical manuals
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 505, Piping Systems • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1, Chapter 13 • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 4, Test, Inspections and Special Applications Maintenance Programs • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 5, Quality Maintenance (QA Manual) • NAVEDTRA 10539, EN3

Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about maintaining reducing station(s) components, operation, purpose, inspection, maintenance, troubleshooting, repair, and testing.

General EN Skill Area	**Mechanical Maintenance**
A skill you are expected to perform from the General Skill Area above:	**Maintain Ship's Whistle**
Knowledge you should have to perform this skill:	• Recall maintenance and repair requirements and procedures for the ship's whistle • Recall the function of the components of related equipment • Recall the safety procedures for working aloft • Recall the procedures to tagout and isolate system(s) • Recall the procedures for removal, disassembly, inspection, cleaning, repair, and testing the ship's whistle components in accordance with PMS or NAVSEA technical manuals
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 505, Piping Systems • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1, Chapter 13 • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 4, Test, Inspections and Special Applications Maintenance Programs • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 5, Quality Maintenance (QA Manual) NAVEDTRA 10539, EN3

Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about maintaining the components of the ship's whistle, the purpose and operation of the whistle, and inspection, maintenance, troubleshooting, repair, and testing of the whistle

General EN Skill Area	**Mechanical Maintenance**
A skill you are expected to perform from the General Skill Area above:	**Maintain Auxiliary Boilers, Distilling Plants, and Potable Water Systems**
Knowledge you should have to perform this skill:	• Recall maintenance and repair requirements and procedures for auxiliary boilers, distilling plants, and potable water system(s) equipment, and the theory and , function of each system and the related equipment components • Recall the safety procedures for working with rotating equipment and handling chemicals • Recall the procedures to tagout and isolate system(s) • Recall the procedures for removal, disassembly, cleaning, inspection, repair, and testing boilers, evaporators, and potable water system components in accordance with PMS or NAVSEA technical manuals
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 220, Volume 1, Boiler Water/Feedwater-Water • NSTM, Chapter 220, Volume 2, Boiler Water/Feedwater-Test and Treatment • NSTM, Chapter 221, Boilers • NSTM, Chapter 254, Condensers, Heat Exchangers, and Air Ejectors • NSTM, Chapter 531, Volume 1, Desalination Low-Pressure Distilling Plants • NSTM, Chapter 531, Volume 2, Desalination Vapor Compression Distilling

	Plants • NSTM, Chapter 531, Volume 3, Desalination Reverse Osmosis Distilling Plants • NSTM, Chapter 533, Potable Water Systems • NSTM, Chapter 670, Stowage, Handling, and Disposal of Hazardous General Use Consumables • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1, Chapter 13 • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790. 3, Volume 4, Test, Inspections and Special Applications Maintenance Programs • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 5, Quality Maintenance (QA Manual) • NAVEDTRA 10539, EN3
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about maintaining auxiliary boilers, distilling plants, and potable water systems equipment, theory, arrangement of components, operation, purpose, inspection, maintenance, troubleshooting, repair, and testing.

General EN Skill Area	**Fabrication and Manufacturing**
A skill you are expected to perform from the General Skill Area above:	**Fabricate Flexible Hose Assemblies, Gaskets, and Tubing**
Knowledge you should have to perform this skill:	• Recall procedures for measuring, cutting, and fabricating flexible hoses(s), tubing, gaskets, and lagging pads • Recall the safety procedures for working with rotating equipment and hand tools • Recall the procedures to tagout and isolate system(s) • Recall procedures for removing, disassembling, and inspecting manufactured flexible hoses, gaskets, tubing, and lagging pad components in accordance with PMS or NAVSEA technical manuals
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 075, Fasteners • NSTM, Chapter 078, Volume 1, Seals • NSTM, Chapter 505, Piping Systems • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1, Chapter 13 • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 4, Test, Inspections and Special Applications Maintenance Programs • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 5, Quality Maintenance (QA Manual)

	• NAVEDTRA 10539, EN3
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about how to fabricate, install, fit, inspect, and test lagging pads.

General EN Skill Area	**Pollution Control**
A skill you are expected to perform from the General Skill Area above:	**Perform Oil Spill Drills**
Knowledge you should have to perform this skill:	Recall the duties and responsibilities of team members in oil spill drills to include the following: • Recall the location of oil spill cleanup kit • Identify the components contained in the oil containment kit
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 593, Pollution Control • NSTM, Chapter 670, Stowage, Handling, and Disposal of Hazardous General Use Consumables • OPNAVINST 3120.32, Standard Organization and Regulations of the U.S. Navy • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1, Chapter 13 • OPNAVINST 5100.23, Navy Occupational Safety and Health (NAVOSH) Program Manual • 0994-LP-013-6010, U.S. Navy Oil Spill Containment and Cleanup Kit
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about procedures used to contain oil spills, inventory equipment, and dispose of material. Also duties and responsibilities of team members.

General EN Skill Area	**Technical Administration**
A skill you are expected to perform from the General Skill Area above:	**Maintain and Review Logs, Drawings, and JSN Logs**
Knowledge you should have to perform this skill:	• Recall requirements and procedures for reviewing and recording equipment readings • Recall requirements and procedures for reviewing drawings, sketches, HAZMAT sheets, and JSN logs
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 090, Inspections, Test, Records and Reports • NSTM, Chapter 504, Pressure, Temperature, and Other Mechanical and Electromechanical Measuring Instruments • OPNAVINST 4790.4, Ship's Maintenance and Material Management (3-M) Manual • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1, Chapter 13 • OPNAVINST 5100.23, Navy Occupational Safety and Health (NAVOSH) Program Manual • NAVEDTRA 12014, Blueprint and Sketching • NAVSEA 3210/1, Engineer's Bell Book • NAVEDTRA 10539, EN3
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about how to review and record equipment readings, drawings and sketches, HAZMAT sheets, and JSN logs.

General EN Skill Area	**Material Casualty Control**
A skill you are expected to perform from the General Skill Area above:	**Train and Participate in Casualty Operation, Maintenance, and Repair Procedures**
Knowledge you should have to perform this skill:	• Recall requirements and procedures for planning training in casualty control drills (ECCTT, DCCTT), • Recall HAZMAT organizational structure • Recall 3-M maintenance requirements • Recall COSAL requirements • Recall requirements for participation in shipboard casualty control drills • Recall requirements and procedures for performing maintenance and repair on equipment using the PMS system • Recall procedure for researching HAZMAT user's guide for safety application
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • EUG, EOSS User's Guide • NSTM, Chapter 079, Volume 2, Damage Control-Practical Damage • NSTM, Chapter 079, Volume 3, Damage Control-Engineering Casualty Control • NSTM, Chapter 233, Diesel Engines • NSTM, Chapter 555, Volume 1, Surface Ship Firefighting • NWP 3-20.31, Surface Ship Survivability • OPNAVINST 3120.32, Standard Organization and Regulations of the U.S. Navy • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1,

	Chapter 13 • OPNAVINST 5100.23, Navy Occupational Safety and Health (NAVOSH) Program Manual • NAVEDTRA 12014, Blueprint Reading and Sketching • NAVEDTRA 10539, EN3
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about how to train and participate in casualty control drills (ECCTT, DCCTT), HAZMAT organization, 3-M maintenance, and COSAL.

General EN Skill Area	**Laboratory Analysis**
A skill you are expected to perform from the General Skill Area above:	**Sample, Test, and Treat Water, Fuel and Lube Oil Samples**
Knowledge you should have to perform this skill:	Recall the procedures for taking (sampling), testing, treating, and disposing of hazardous materials to include the following: • Feedwater • Potable water • Jacketed water • Fuel oil (F-44 and JP-5) • Lube oil (9250, 2190, 2135, etc.)
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 090, Inspections, Test, Records and Reports • NSTM, Chapter 220, Volume 1, Boiler Water/Feedwater-Water Chemistry • NSTM, Chapter 220, Volume 2, Boiler Water/Feedwater-Test and Treatment • NSTM, Chapter 220, Volume 3, Corrosion and Contamination Control for Diesel Engines • NSTM, Chapter 221, Boilers • NSTM, Chapter 233, Diesel Engines • NSTM, Chapter 262, Lubricating Oils, Greases, Specialty Lubricants, and Lubrication Systems • NSTM, Chapter 533, Potable Water • NSTM, Chapter 541, Ship Fuel and Fuel Systems • NSTM, Chapter 542, Gasoline and JP-5 Fuel Systems • NSTM, Chapter 556, Hydraulic Equipment

	(Power Transmission and Control) • NSTM, Chapter 562, Surface Ship Steering Systems • NSTM, Chapter 670, Stowage, Handling, and Disposal of Hazardous General Use Consumables • NAVEDTRA 10539, EN3
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about how to take, test (analysis), and treat samples of hazardous material and dispose of accordingly.

Part 2

Advancement Handbook for EN2

Advancement Handbook for EN2

General EN Skill Area	**Mechanical Systems Operations**
A skill you are expected to perform from the General Skill Area above:	**Adjust Air Conditioning and Refrigeration Systems**
Knowledge you should have to perform this skill:	Recall requirements and procedures followed to make adjustments on the components of A/C & R equipment to include the following: • Compressors • Unloaders and capacity control devices • Regulating valves and relief valves • High, low, and failure pressure switches • Heating and cooling ventilation systems
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 510, Ventilation, Heating, Cooling, and Air Conditioning Systems for Surface Ships. • NSTM, Chapter 516, Refrigeration Systems • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1, Chapter 13 • NAVEDTRA 12149, EN2
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on adjustment of system components, unloading valves, capacity control, water regulating valves, and switches.

Advancement Handbook for EN2

General EN Skill Area	**Mechanical Systems Operations**
A skill you are expected to perform from the General Skill Area above:	**Adjust Air Compressors**
Knowledge you should have to perform this skill:	• Recall requirements and procedures followed to make adjustments on the components of LP, MP, and HP air compressors.
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 505, Piping Systems • NSTM, Chapter 551, Compressed Air Plants and Systems • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1, Chapter 13 • NAVEDTRA 12149, EN2
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on adjustment of system components, unloading valves, water regulating valves, and switches.

General EN Skill Area	**Mechanical Maintenance**
A skill you are expected to perform from the General Skill Area above:	**Maintain and Repair Air Conditioning and Refrigeration Systems**
Knowledge you should have to perform this skill:	Recall maintenance and repair requirements and procedures for A/C &R operating systems and components to include the following: • Compressors, condenser and receivers, and evaporators • Unloaders and capacity control devices • Regulating valves and relief valves • High, low, and failure pressure switches • Heating and cooling ventilation systems
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 510, Ventilation, Heating, Cooling, and Air Conditioning Systems for Surface Ships • NSTM, Chapter 516, Refrigeration Systems • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1, Chapter 13 • NAVEDTRA 12149, EN2
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on safety and maintaining system components on compressors, unloading valves, capacity control valves, replacing shaft seals, repairing and cleaning condensers, testing and adjusting TXV's, water regulating valves, switches, evacuating, dehydrating, and recovery of refrigerant in the system.

General EN Skill Area	**Mechanical Maintenance**
A skill you are expected to perform from the General Skill Area above:	**Maintain Steam and Distilling Systems**
Knowledge you should have to perform this skill:	Recall maintenance and repair requirements and procedures for the components of steam and distilling plants operating systems to include the following: • Auxiliary boilers (fire-tube, water-tube, waste heat, and electric) • Submerged-tube, flash-type, heat recovery, and reverse osmosis type distilling plants • Water testing and treatment • Control devices • Lay-ups • Hydrostatic testing
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 075, Fasteners • NSTM, Chapter 220, Volume 1, Boiler Water/Feedwater-Water Chemistry • NSTM, Chapter 220, Volume 2, Boiler Water/Feedwater-Test and Treatment • NSTM, Chapter 221, Boilers • NSTM, Chapter 254, Condensers, Heat Exchangers, and Air Ejectors • NSTM, Chapter 531, Volume 1, Desalination Low-Pressure Distilling Plants • NSTM, Chapter 531, Volume 2, Desalination Vapor Compression Distilling Plants • NSTM, Chapter 531, Volume 3, Desalination Reverse Osmosis Distilling Plants

	• Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 4, Test, Inspections and Special Applications Maintenance Programs • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 5, Quality Maintenance (QA) Manual • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1, Chapter 13 • NAVEDTRA 12149, EN2
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on safety and maintaining system components to include troubleshooting and repair of distilling plants, boilers, and associated equipment, testing of water to include feedwater (reserve and makeup), distillate, and potable water.

General EN Skill Area	**Mechanical Maintenance**
A skill you are expected to perform from the General Skill Area above:	**Maintain Cargo Hatches, Bow Ramps, Stern Gates, Cranes, Escalators, Davits, Conveyors, and Elevators**
Knowledge you should have to perform this skill:	Recall maintenance and repair requirements and procedures for auxiliary equipment systems to include the following: • Cargo hatches, bow ramps, and stern gates, water barriers • Cranes, boat davits, and winches • Escalators, elevators, and dumbwaiters • Conveyors, monorails, and turntables
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 572, Shipboard Store and Provisions Handling • NSTM, Chapter 573, Booms • NSTM, Chapter 584, Stern Gates, Ramps, Bow Doors, Turntables and Water Barriers • NSTM, Chapter 589, Cranes • Joint Fleet Maintenance Manual (JFMM) CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 4, Test, Inspections and Special Applications Maintenance Programs • Joint Fleet Maintenance Manual (JFMM) CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 5, Quality Maintenance (QA) Manual • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1, Chapter 13 • NAVEDTRA 12149, EN2

Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on safety and maintaining system components to include troubleshooting and repair of auxiliary equipment and associated equipment.

General EN Skill Area	**Mechanical Maintenance**
A skill you are expected to perform from the General Skill Area above:	**Maintain Hydraulic Equipment**
Knowledge you should have to perform this skill:	Recall maintenance and repair requirements and procedures for hydraulic systems to include the following: • Pitch control units • Steering gear systems • Anchor windlasses • Ballast control units • Pumps • Piping systems
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 075, Fasteners • NSTM, Chapter 078, Volume 1, Seals • NSTM, Chapter 262, Lubricating Oils, Greases, Specialty Lubricants, and Lubrication Systems • NSTM, Chapter 503, Pumps • NSTM, Chapter 505, Piping Systems • NSTM, Chapter 556, Hydraulic Equipment (Power Transmission and Control) • NSTM, Chapter 562, Surface Ship Steering Systems • NSTM, Chapter 670, Stowage, Handling, and Disposal of Hazardous General Use Consumables • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1, Chapter 13 • NAVEDTRA 12964, Fluid Power • NAVEDTRA 12149, EN2

Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on safety and maintaining system components to include troubleshooting and repair of hydraulic equipment valves, piping systems, pumps, heat exchangers, filtration, reservoirs, accumulators, and fasteners.

General EN Skill Area	**Mechanical Maintenance**
A skill you are expected to perform from the General Skill Area above:	**Maintain Auxiliary Cooling Water, Firemain, and Drainage Systems**
Knowledge you should have to perform this skill:	Recall maintenance and repair requirements and procedures for auxiliary cooling water, firemain, and drainage systems to include the following: • Heat exchangers, condensers, and coolers • Pumps and motors • Piping, fittings, and valves (isolation valves) • Fasteners and hangers
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 075, Fasteners • NSTM, Chapter 078, Volume 1, Seals • NSTM, Chapter 262, Lubricating Oils, Greases, Specialty Lubricants, and Lubrication Systems • NSTM, Chapter 503, Pumps • NSTM, Chapter 505, Piping Systems • NSTM, Chapter 556, Hydraulic Equipment (Power Transmission and Control) • NSTM, Chapter 562, Surface Ship Steering Systems • NSTM, Chapter 670, Stowage, Handling, and Disposal of Hazardous General Use Consumables • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1, Chapter 13 • NAVEDTRA 12964, Fluid Power • NAVEDTRA 12149, EN2

Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on safety and maintaining system components to include troubleshooting and repair of hydraulic equipment valves, piping systems, pumps, heat exchangers, filtration, reservoirs, accumulators, and fasteners.

General EN Skill Area	**Mechanical Maintenance**
A skill you are expected to perform from the General Skill Area above:	**Maintain Gasoline and Diesel Engines**
Knowledge you should have to perform this skill:	Recall maintenance and repair requirements and procedures for gasoline and diesel engines, and associated systems to include the following: • Ignition and fuel injection systems • Intake and exhaust systems • Blowers and turbochargers • Cylinder heads and blocks • Engine frames and attached components
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 233, Diesel Engines • NSTM, Chapter 542, Gasoline and JP-5 Fuel Systems • NSTM, Chapter 583, Boats and Small Craft • 0910-LP-118-1600, Diesel Inspector Handbook, Part 1 • 0910-LP-118-1700, Diesel Inspector Handbook, Part 2 • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1, Chapter 13 • NAVEDTRA 12149, EN2 • NAVEDTRA 10539, EN3 • NAVEDTRA 12170, Engineman Fundamentals, Volume 1

Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on safety and maintaining gasoline and diesel engines and their system components to include: troubleshooting, repairing, inspecting, testing, repairing and overhauling engine blocks, cylinder liners, ignition, intake and exhaust (valves), air systems, fuel injection (pumps, unit injectors, APE, APF, etc.) system, lube oil system (attached and remote pumps), filters and strainers, and starting and cooling systems.

General EN Skill Area	**Mechanical Maintenance**
A skill you are expected to perform from the General Skill Area above:	**Maintain Governors, Speed Limiters, Overspeed Trips, and Shutdown Safety Devices**
Knowledge you should have to perform this skill:	Recall maintenance and repair requirements and procedures for governors, speed limiters, and overspeed trips • Be familiar with terminology associated with governors • Recall the types of governors • Test overspeed safety devices and governors • Test emergency shutdown devices
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 233, Diesel Engines • 0910-LP-118-1600, Diesel Inspector Handbook, Part 1 • 0910-LP-118-1700, Diesel Inspector Handbook, Part 2 • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1, Chapter 13 • NAVEDTRA 12149, EN2 • NAVEDTRA 10539, EN3 • NAVEDTRA 12170, Engineman Fundamentals, Volume 1
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on safety and maintaining speed controlling devices to include the terminology (speed droop, hunting, isochronous governing, stability, sensitivity, promptness) mechanical, hydraulic, and

	overspeed safety devices (trips and or limiters), emergency shutdown devices, adjusting and testing, and cleanliness of the system components.

General EN Skill Area	**Mechanical Maintenance**
A skill you are expected to perform from the General Skill Area above:	**Maintain Pitch Control Units**
Knowledge you should have to perform this skill:	• Recall maintenance and repair requirements and procedures for CPP/CRP systems • Perform routine maintenance on system components, such as oil distribution box (OD Box), hydraulic oil power module (HOPM), head tank, sump tank, filters and strainers.
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NAVEDTRA 12964, Fluid Power • NSTM, Chapter 245, Propellers • NSTM, Chapter 262, Lubricating Oils, Greases, Specialty Lubricants, and Lubrication Systems • NSTM, Chapter 556, Hydraulic Equipment (Power Transmission and Control) • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1, Chapter 13 • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 4, Test, Inspections and Special Applications Maintenance Programs • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 5, Quality Maintenance (QA Manual

	• NAVEDTRA 12149, EN2 • NAVEDTRA 10539, EN3
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on safety and maintaining CPP/CRP major components to include basic terminology, manifold block assembly, forward and aft piston, LP oil seals, HP oil seals, valve rod assembly, hub assembly, pitch indicator, servo control valve, crosshead, sliding block, crank pin ring, eccentric pin, valves (in-line, unloading, pressure-reducing, auxiliary servo, sequencing, main relief), Prairie Masker system, operational modes, adjustment, and alignment.

General EN Skill Area	**Mechanical Maintenance**
A skill you are expected to perform from the General Skill Area above:	**Maintain Fuel and Lube Oil Purifiers**
Knowledge you should have to perform this skill:	• Recall maintenance and repair requirements and procedures for fuel and lube oil purifier systems • Recall the principles of operation and capabilities of purifiers • Recall the properties of fuel and lube oil, viscosity, cloud/pour point, flash/fire point, neutralization number, water content, demulsibilty, hardness, and load-carrying ability • Perform routine maintenance on solid-retaining (manual cleaning) and solid-ejecting (self cleaning) purifiers
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 262, Lubricating Oils, Greases, Specialty Lubricants, and Lubrication Systems • NSTM, Chapter 541, Ship Fuel and Fuel Systems • NSTM, Chapter 542, Gasoline and JP-5 Fuel Systems • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1, Chapter 13 • NAVEDTRA 12149, EN2 • NAVEDTRA 10539, EN3

Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on safety and maintaining purifier components to include basic terminology, operational modes (separator or clarifier), optimum temperature ranges of purifying fuel and lube oil, troubleshooting, and repair.

Advancement Handbook for EN2

General EN Skill Area	**Mechanical Systems Operations**
A skill you are expected to perform from the General Skill Area above:	**Maintain Air Systems**
Knowledge you should have to perform this skill:	Recall maintenance and repair requirements and procedures for air systems to include the following: • LP, MP, and HP air compressors • Air receivers/flasks • Reducing stations • Air dryer systems • Starting air systems
References you should study to gain the knowledge you need to perform this skill:	• EOSS and PMS for applicable ship • NSTM, Chapter 505, Piping Systems. • NSTM, Chapter 551, Compressed Air Plants and Systems. • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1, Chapter 13 • NAVEDTRA 12149, EN2
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on maintaining, troubleshooting, repairing and adjusting of system components, such as air compressors, intercoolers, shutdown devices, unloading system, air receivers/flasks, moisture removal (type I, II, III air dryers), reducing stations, valves, water regulating valves, and switches.

General EN Skill Area	**Mechanical Maintenance**
A skill you are expected to perform from the General Skill Area above:	**Maintain Mess Deck, Galley, Scullery Equipment, Laundry Equipment and Dumbwaiters**
Knowledge you should have to perform this skill:	Recall maintenance and repair requirements and procedures for laundry and galley equipment to include the following: • Vegetable peelers • Garbage grinders • Steam jacketed kettles • Dishwashing machines (single, double and triple tanks) • Steamers • Ice machines • Dough mixers • Laundry presses • Washing machines • Hot water heaters
References you should study to gain the knowledge you need to perform this skill:	• PMS for applicable ship • NSTM, Chapter 572, Shipboard Store and Provisions Handling • NSTM, Chapter 655, Laundry • NSTM, Chapter 9340, Commissary Equipment • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1, Chapter 13 • NAVEDTRA 12149, EN2 • NAVEDTRA 10539, EN3

Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on safety and maintenance procedures for specialized equipment to include troubleshooting and repair of kettles (5 to 80 gallons), steam tables, operating parameters of dishwashing machines and washing machines, safety control devices, and shutdown devices.

General EN Skill Area	**Mechanical Maintenance**
A skill you are expected to perform from the General Skill Area above:	**Maintain Reduction Gears and Components**
Knowledge you should have to perform this skill:	• Recall maintenance and repair requirements and procedures for main reduction gears, transmissions, shafting and bearings, stern tube seals, and associated components
References you should study to gain the knowledge you need to perform this skill:	• EOSS or PMS for applicable ship • NSTM, Chapter 078, Volume 1, Seals • NSTM, Chapter 241, Propulsion Reduction Gears, Couplings, Clutches, and Associated Components • NSTM, Chapter 243, Propulsion Shafting • NSTM, Chapter 244, Propulsion Bearings and Seals • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1, Chapter 13 • NAVEDTRA 12149, EN2 • NAVEDTRA 10539, EN3
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on safety and maintaining, troubleshooting, repairing, testing, and overhaul of MRGs, transmissions, repairing or replacing stern tube seals and shaft bearings, operating parameters of equipment, safety control devices, and shutdown devices.

General EN Skill Area	**Mechanical Maintenance**
A skill you are expected to perform from the General Skill Area above:	**Maintain Special Tools**
Knowledge you should have to perform this skill:	Recall maintenance and repair requirements, and procedures for special tools to include the following: • Dial indicators • Dial/vernier calipers • Micrometers • Snap gauges • Bore gauges and strain gauges • Borescopes, endoscopes, and stroboscopes • Torque wrenches • Multipliers • Ridge reamers • Cylinder hones • Dynamometers • Engine specific special tools
References you should study to gain the knowledge you need to perform this skill:	• PMS for applicable tools • NSTM, Chapter 233, Diesel Engines • NSTM, Chapter 504, Pressure, Temperature, and Other Mechanical and Electromechanical Measuring Instruments • OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume1, Chapter 13 • 0910-LP-118-1600, Diesel Inspector Handbook, Part 1 • 0910-LP-118-1700, Diesel Inspector Handbook, Part 2 • NAVEDTRA 12085, Use and Care of Hand

	Tools and Measuring Tools • NAVEDTRA 12149, EN2 • NAVEDTRA 10539, EN3
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on use and maintenance of special tools and procedures for repairing, testing, and storing of the tools.

General EN Skill Area	**Fabrication and Manufacturing**
A skill you are expected to perform from the General Skill Area above:	**Perform Basic Lathe Operations**
Knowledge you should have to perform this skill:	• Recall the operating procedures for a lathe • Identify principle parts of a lathe; such as bed and ways, headstock, carriage, apron, feed rod, lead screw, crossfeed slide, and compound rest • Recall accessories and attachments, such as tool post, tool holders, facing tools, reading tools, boring tools, chucks, centers, followers, taper, and carriage stop • Recall the safety precautions for working around rotating equipment
References you should study to gain the knowledge you need to perform this skill:	• OPNAVINST 5100.19, Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1, Chapter 13 • NAVEDTRA 12085, Use and Care of Hand Tools and Measuring Tools • NAVEDTRA 12149, EN2
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on operational safety precautions, maintenance, basic use of a lathe, identification of the basic parts, and accessories.

General EN Skill Area	**Technical Administration**
A skill you are expected to perform from the General Skill Area above:	**Maintain Records, Logs, Diagrams, Reports, Briefs, and Bulletins**
Knowledge you should have to perform this skill:	• Recall the purpose and maintenance procedures for measuring programs, logs, bulletins, and records and the procedures for interpreting diagrams, evaluating reports, and translating briefs • Recall procedures for each of the following: • Evaluating engineering logs and engineer's bell book • Analyzing operating logs, fuel, and water reports • Analyzing monthly summary reports • Reviewing instrument and tagout logs • Interpreting trend analysis readings • Validating blueprint reading • Managing meter cards • Implementing service bulletins
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 090, Inspections, Test, Records and Reports • NSTM, Chapter 094, Trials • NAVSEA 3210/1, Engineer's Bell Book • OPNAVINST 4100.11, Navy Energy Reporting System (NEURS) • 0910-LP-118-1600, Diesel Inspector Handbook, Part 1 • 0910-LP-118-1700, Diesel Inspector Handbook, Part 2 • NAVEDTRA 12014, Blueprint Reading and Sketching • NAVEDTRA 12149, EN2 • NAVEDTRA 10539, EN3

Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on legal record keeping, maintaining logs, correctly obtaining readings and interpreting, recording data, and reporting any abnormal conditions, disposing of engineering records, measure programs, instrument and tagouts, trend analysis, and service bulletins.

Advancement Handbook for EN2

General EN Skill Area	**Laboratory Analysis**
A skill you are expected to perform from the General Skill Area above:	**Test Water Samples**
Knowledge you should have to perform this skill:	• Recall the different sampling and testing methods associated with boiler water, feedwater, distillate, potable water, and diesel engine jacket water • Describe sampling procedures • Evaluate testing options • Analyze correct treatment
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 220, Volume 1, Boiler Water/Feedwater-Water Chemistry • NSTM, Chapter 220, Volume 2, Boiler Water/Feedwater-Test and Treatment • NSTM, Chapter 220, Volume 3, Corrosion and Contamination Control for Diesel Engine Cooling Water Systems • NAVEDTRA 12149, EN2 • NAVEDTRA 10539, EN3
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on correct sampling procedures and testing and identifying corrective treatments for water samples.

Advancement Handbook for EN2

General EN Skill Area	**Quality Assurance**
A skill you are expected to perform from the General Skill Area above:	**Manage and Supervise QA Assignments, Monitor and Advise on Repairs and Tests**
Knowledge you should have to perform this skill:	• Analyze and determine the different planning procedures for QA jobs • Describe the QA program • Recall the organization and training involved in QA • Identify QA levels • Describe the process involved • Recall procedure for interpreting QA test results • Determine corrective action • Recall the terms used in QA • Identify the different forms that are used for QA program
References you should study to gain the knowledge you need to perform this skill:	• Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 4, Test, Inspections and Special Applications Maintenance Programs • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 5, Quality Maintenance (QA Manual) • NAVEDTRA 12149, EN2 • NAVEDTRA 10539, EN3
Exam Expectations. These are subject areas you should know to help you answer exam questions.	You can expect questions on the QA organization, program operation, requirements for a departure from specification; controlled work packages, QA levels, and corrects forms.

Part 3

Advancement Handbook for EN1

Advancement Handbook for EN1

General EN Skill Area	**Mechanical Maintenance**
A skill you are expected to perform from the General Skill Area above:	**Install and Operate Oil Flush Systems**
Knowledge you should have to perform this skill:	Recall maintenance and operational procedures for oil flushing systems to include the following: • Diesel engines • Main reduction gears • Lube oil and fuel piping
References you should study to gain the knowledge you need to perform this skill:	• NSTM, Chapter 090, Inspections, Test, Records and Reports • NSTM, Chapter 233, Diesel Engines • NSTM, Chapter 262, Lubricating Oils, Greases, Specialty Lubricants, and Lubrication Systems • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 4, Test, Inspections and Special Applications Maintenance Programs • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 5, Quality Maintenance (QA Manual • NAVEDTRA 10543-E1, EN 1 & C
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on how to install hot oil flushing equipment, flushing prerequisites, external flushing procedures, final flushing procedures, and post-flush clean-up procedures on equipment.

Advancement Handbook for EN1

General EN Skill Area	**Technical Administration**
A skill you are expected to perform from the General Skill Area above:	**Maintain Manuals, Logs, and Reports**
Knowledge you should have to perform this skill:	Recall requirements and procedures to analyze, critique, review, correct, and prepare manuals, logs, and reports to include the following: • Maintenance reports • Calibration schedules • EOSS reports • Estimate fuel, oil, and water requirements • Review and update fueling records • Trend analysis • PMS records
References you should study to gain the knowledge you need to perform this skill:	• NAVEDTRA 12147, Engineering Administration • NAVEDTRA 10808-2, Safety Supervisor • NAVEDTRA 10543-E1, EN 1 & C • EUG, EOSS User's Guide • NSTM, Chapter 090, Inspections, Test, Records and Reports • OPNAVINST 4100.11, Navy Energy Reporting System (NEURS) • OPNAVINST 4790.4, Ship's Maintenance and Material Management (3-M) Manual
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on how to correctly fill out reports, provide feedback, and how to interpret manuals, logs, and reports.

Advancement Handbook for EN1

General EN Skill Area	**Management and Supervision**
A skill you are expected to perform from the General Skill Area above:	**Analyze Ship's Drawings and Monitor Equipment Operational Tests**
Knowledge you should have to perform this skill:	Recall requirements and procedures to analysis, evaluate, and monitor tests to include the following: • Ship's technical drawings • Alterations to equipment • Ship alterations • Contract trials to include builder's (dock, sea, and acceptance trials), final contract trials (INSURV), and special trials (economy, noise, and vibration, etc.)
References you should study to gain the knowledge you need to perform this skill:	• NAVEDTRA 12147, Engineering Administration • NAVEDTRA 10543-E1, EN 1 & C • NSTM, Chapter 090, Inspections, Test, Records and Reports • NSTM, Chapter 094, Trials • OPNAVINST 3120.32, Standard Organization and Regulations of the U.S. Navy
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on how to interpret ship's drawings and to correct them due to ship alterations, and identify and explain the purpose of the different ship trials.

Advancement Handbook for EN1

General EN Skill Area	**Quality Assurance**
A skill you are expected to perform from the General Skill Area above:	**Conduct QA Inspections**
Knowledge you should have to perform this skill:	Recall inspection requirements and procedures to include the following: • Levels of assurance • Control work packages • Organizational responsibilities • Terminology and definitions • Forms, reports, and records
References you should study to gain the knowledge you need to perform this skill:	• Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 4, Test, Inspections and Special Applications Maintenance Programs • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 5, Quality Maintenance (QA Manual)
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on what equipment or systems require QA packages, levels of assurance, proper forms to use, acceptance requirements for hydrostatic test, and departure from specification requirements.

Part 4

Advancement Handbook for ENC

General EN *Skill Area*	**Technical Administration**
A *skill* you are expected to perform from the General Skill Area above:	**Prepare and Review Casreps and Cascors**
Knowledge you should have to perform this skill:	Recall the procedures for preparing and reviewing Consolidated Fleet Casualty Report (CASREP) and Casualty Correction Reports (CASCORS) to include the following: • Different levels of reporting CASREPS • Situation reports (SITREPs)
References you should study to gain the knowledge you need to perform this skill:	• NAVSURFLANT Maintenance Manual, COMNAVSURFLANTINST 9000.1 • NAVEDTRA 12147, Engineering Administration • NAVEDTRA 10543-E1, EN 1 & C
Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on how to prepare a CASREP/CASCOR/SITREPs, and how to prioritize and track reports.

General EN *Skill Area*	**Management and Supervision**
A *skill* you are expected to perform from the General Skill Area above:	**Maintain Logs and Advise on Equipment Repair and Reliability**
Knowledge you should have to perform this skill:	Recall the contents of basic engineering logs and records, as well as such items as inspections, administrative procedures, training, preventive maintenance, and repair procedures to include the following: • Engineering logs and records (Engineer's Bell Book, Engineering Log, Fuel and Water Reports, etc.) • Full and economy trials • Ship's trials (builder's, acceptance, final contract, post repair, tactical, etc.) • Ship and machinery alterations • Training program • Board of inspection and survey (INSURV) • Technical repairs
References you should study to gain the knowledge you need to perform this skill:	• EUG, EOSS User's Guide • NSTM, Chapter 079, Volume 3, Damage Control-Engineering Casualty Control • NSTM, Chapter 090, Inspections, Test, Records and Reports • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 5, Quality Maintenance (QA Manual) • NAVSEA 3210/1, Engineer's Bell Book • NAVEDTRA 12147, Engineering Administration • NAVEDTRA 10543-E1, EN 1 & C

Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions about scheduling repairs and overhaul of equipment, instructions and continuance of inspections, safety awareness, supervisory functions, training criteria, and overall administrative functions.

General EN *Skill Area*	**Quality Assurance**
A *skill* you are expected to perform from the General Skill Area above:	**Conduct, Prepare, and Monitor QA Programs**
Knowledge you should have to perform this skill:	Recall the purpose and the concept behind the QA Program to include the following: • Major components • Responsibilities of the ship or fleet maintenance activities (FMA) quality assurance personnel from craftsman to the commanding officer • Controlled work requirements • Material control • Testing requirements • Departure from specifications (DFS) • Audits and surveillance • Personnel qualification and training • Records retention • Forms (QA forms 1 through 35)
References you should study to gain the knowledge you need to perform this skill:	• Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 4, Test, Inspections and Special Applications Maintenance Programs • Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 5, Quality Maintenance (QA Manual) • NAVEDTRA 12147, Engineering Administration • NAVEDTRA 10543-E1, EN 1 & C

Exam Expectations. These are subject areas you should know to help you answer exam questions correctly:	You can expect questions on QA program concepts, the organizational structure, levels of responsibilities, training program, terminology, and various forms used.

Appendix 1

References Used in This Advancement Handbook

Rating	Short Title	Long Title	Chapters/ Paragraphs	Stocking Point
EN3	NAVEDTRA 12044	Military Requirements Petty Officer Third Class	N/A	Note 1
	NAVEDTRA 12014	Blueprint Reading and Sketching	N/A	Note 1
	NAVEDTRA 12085	Use and Care of Hand Tools and Measuring Tools	N/A	Note 1
	NAVEDTRA 12964	Fluid Power	N/A	Note 1
	NAVSEA 3210/1	Engineer's Bell Book	N/A	Note 1
	NAVEDTRA 10539	Engineman 3	N/A	Note 1
	NAVEDTRA 12170	Engineman Fundamentals, Volume 1	N/A	Note 1
	Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 4	Test, Inspections and Special Applications Maintenance Programs	N/A	Note 4
	Joint Fleet Maintenance Manual (JFMM), CINCLANTFLTINST/CINCPACFLTINST 4790.3, Volume 5	Quality Maintenance (QA Manual)	N/A	Note 4
	EOSS	Engineering Operational Sequence System	N/A	Note 1
	EUG	EOSS User's Guide	N/A	Note 1
	S9086-CJ-STM-000	NSTM, Chapter 075, Fasteners	N/A	Note 1
	S9086-CM-STM-010	NSTM, Chapter 078, Volume 1, Seals	N/A	Note 1
	S9086-CN-STM-020	NSTM, Chapter 079, Volume 2, Damage Control-Practical Damage	N/A	Note 1
	S9086-CN-STM-030	NSTM, Chapter 079, Volume 3, Damage Control-Engineering Casualty Control	N/A	Note 1
	S9086-CZ-STM-000	NSTM, Chapter 090, Inspections, Test, Records and Reports	N/A	Note 1
	S9086-GX-STM-010	NSTM, Chapter 220, Volume 1, Boiler Water/Feedwater-Water Chemistry	N/A	Note 1
	S9086-GX-STM-020	NSTM, Chapter 220, Volume 2, Boiler Water/Feedwater-Test and Treatment	N/A	Note 1
	S9086-GX-STM-030	NSTM, Chapter 220, Volume 3, Corrosion and Contamination Control for Diesel Engine Cooling Water Systems	N/A	Note 1
	S9086-GY-STM-010	NSTM, Chapter 221, Boilers	N/A	Note 1
	S9086-HB-STM-010	NSTM, Chapter 233, Diesel Engines	N/A	Note 1
	S9086-HK-STM-010	NSTM, Chapter 241, Propulsion Reduction Gears, Couplings, Clutches, and Associated Components	N/A	Note 1

	S9086-HM-STM-010	NSTM, Chapter 243, Propulsion Shafting	N/A	Note 1
	S9086-HN-STM-010	NSTM, Chapter 244, Propulsion Bearings and Seals	N/A	Note 1
	S9086-HP-STM-010	NSTM, Chapter 245, Propellers	N/A	Note 1
	S9086-HY-STM-010	NSTM, Chapter 254, Condensers, Heat Exchangers, and Air Ejectors	N/A	Note 1
	S9086-H7-STM-010	NSTM, Chapter 262, Lubricating Oils, Greases, Specialty Lubricants, and Lubrication Systems	N/A	Note 1
	S9086-RH-STM-010	NSTM, Chapter 503, Pumps	N/A	Note 1
	S9086-RJ-STM-010	NSTM, Chapter 504, Pressure, Temperature, and Other Mechanical and Electromechanical Measuring Instruments	N/A	Note 1
	S9086-RK-STM-010	NSTM, Chapter 505, Piping Systems	N/A	Note 1
	S9086-RQ-STM-010	NSTM, Chapter 510, Heating, Ventilating, and Air Conditioning Systems for Surface Ships	N/A	Note 1
	S9086-RW-STM-010	NSTM, Chapter 516, Refrigeration Systems	N/A	Note 1
	S9086-SC-STM-010	NSTM, Chapter 531, Volume 1, Desalination Low-Pressure Distilling Plants	N/A	Note 1
	S9086-SC-STM-020	NSTM, Chapter 531, Volume 2, Desalination Vapor Compression Distilling Plants	N/A	Note 1
	S9086-SC-STM-030	NSTM, Chapter 531, Volume 3, Desalination Reverse Osmosis Distilling Plants	N/A	Note 1
	S9086-SE-STM-010	NSTM, Chapter 533, Potable Water Systems	N/A	Note 1
	S9086-SN-STM-010	NSTM, Chapter 541, Ship Fuel and Fuel Systems	N/A	Note 1
	S9086-SP-STM-010	NSTM, Chapter 542, Gasoline and JP-5 Fuel Systems	N/A	Note 1
	S9086-SY-STM-010	NSTM, Chapter 551, Compressed Air Plants and Systems	N/A	Note 1
	S9086-S3-STM-010	NSTM, Chapter 555, Volume 1, Surface Ship Firefighting	N/A	Note 1
	S9086-S4-STM-010	NSTM, Chapter 556, Hydraulic Equipment (Power Transmission and Control)	N/A	Note 1
	S9086-TA-STM-010	NSTM, Chapter 562, Surface Ship Steering Systems	N/A	Note 1
	S9086-TL-STM-000	NSTM, Chapter 572, Shipboard Store and Provisions Handling	N/A	Note 1
	S9086-TM-STM-000	NSTM, Chapter 573, Booms	N/A	Note 1
	S9086-TV-STM-010	NSTM, Chapter 581, Anchoring	N/A	Note 1
	S9086-TX-STM-010	NSTM, Chapter 583, Boats and Small Craft	N/A	Note 1

	S9086-TY-STM-000	NSTM, Chapter 584, Stern Gates, Ramps, Bow Doors, Turntables, and Water Barriers	N/A	Note 1
	S9086-T4-STM-010	NSTM, Chapter 589, Cranes	N/A	Note 1
	S9086-T8-STM-010	NSTM, Chapter 593, Pollution Control	N/A	Note 1
	S9086-V4-STM-010	NSTM, Chapter 655, Laundry	N/A	Note 1
	S9086-WK-STM-010	NSTM, Chapter 670, Stowage, Handling, and Disposal of Hazardous General Use Consumables	N/A	Note 1
	0901-LP-340-0001	NSTM, Chapter 9340, Commissary Equipment	N/A	Note 1
	NWP 3-20.31	Surface Ship Survivability	N/A	Note 1
	OPNAVINST 3120.32	Standard Organization and Regulations of the U.S. Navy	N/A	Note 3
	OPNAVINST 4100.11	Navy Energy Reporting System (NEURS)	N/A	Note 3
	OPNAVINST 4790.4	Ship's Maintenance and Material Management (3-M) Manual	Chaps 1,2,3,4,5,6	Note 3
	OPNAVINST 5100.19	Navy Occupational Safety and Health (NAVOSH) Program Manual for Forces Afloat, Volume 1	Chapter 13	Note 3
	OPNAVINST 5100.23	Navy Occupational Safety and Health (NAVOSH) Program Manual	N/A	Note 3
	0910-LP-118-1600	Diesel Inspector Handbook, Part 1	N/A	Note 1
	0910-LP-118-1700	Diesel Inspector Handbook, Part 2	N/A	Note 1
	0994-LP-013-6010	U.S. Navy Oil Spill Containment and Cleanup Kit	N/A	Note 1
EN2	NAVEDTRA 12045	Military Requirements for Petty Officer Second Class	N/A	Note 1
	NAVEDTRA 12149	Engineman 2	N/A	Note 1
	S9086-C4-STM-000	NSTM, Chapter 094, Trials	N/A	Note 1
EN1	NAVEDTRA 12046	Military Requirements for Petty Officer First Class	N/A	Note 1
	NAVEDTRA 10543-E1	Engineman First Class and Chief	N/A	Note 1
	NAVEDTRA 12147	Engineering Administration	N/A	Note 1
	NAVEDTRA 10808-2	Safety Supervisor	N/A	Note 1
ENC	NAVEDTRA 12047	Military Requirements Chief Petty Officer	N/A	Note 1

LEGEND:

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Note 4 – Available via INTERNET http://www.spear.navy.mil/JFMM

Note 5 – To order, submit request on DD Form 1425 0102-LF-009-7400